

Waves, Sound, and Light Review Problems
CP and Honors Physics

1. If the intensity of a person's voice is $4.6 \times 10^{-7} \text{ W/m}^2$ at a distance of 2.0 m, how much sound power does that person generate? [$2.3 \times 10^{-5} \text{ W}$]
2. The power output of a tuba is 0.35 W. At what distance is the sound intensity of the tuba $1.2 \times 10^{-3} \text{ W/m}^2$? [4.8 m]
3. A violin string that is 50.0 cm long has a fundamental frequency of 440 Hz. What is the speed of the waves on this string? [440 m/s]
4. An open organ pipe (both ends are open) is 2.46 m long, and the speed of the air in the pipe is 345 m/s.
 - a. What is the fundamental frequency of this pipe? [70.1 Hz]
 - b. How many harmonics are possible in the normal hearing range, 20 Hz to 20000 Hz? [285]
5. Sunlight traveling through air ($n = 1.00$) passes into a raindrop ($n = 1.33$) at an angle of 22.5° from the normal at one point on the droplet. What is the angle of refraction? [16.7°]